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The Cereal Box Syndrome

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SETI* (*Search for Extra-Terrestrial Intelligence) has long been the province of the radioastronomer. While this, in itself, is neither bad news nor good, these early workers and their attitudes have left an indelible imprint on the field that persists to this day. One year after Cocconi and Morrison first seriously proposed a search at the 21-cm wavelength, Ronald Bracewell suggested the use of interstellar spaceprobes for communication among sentient races. However, many SETI workers for years have virtually ignored this possibility, and have maintained that listening for radio signals of intelligent extrasolar origin is the only reasonable way to open up interstellar communications. All this stuff about traveling around the universe," remarked one well-known American radio physicist in an oft-quoted passage, "belongs back where it came from, on the cereal box."

It seems to be the nature of this "Cereal Box Syndrome" that those affected seldom recognize their affliction. This is a potentially serious problem as radio-based SETI research enters the megabuck funding range and thereby risks unnecessarily "pricing itself out" of an already parsimonious market. Alternative less-expensive search programs based on the concept of advanced spacefaring automata have been devised and continue to be developed. Why, then, the traditional intellectual hostility to the idea of interstellar missions?

The first reason is simply the lack of interested practitioners. A mere handful of lucky individuals are fortunate enough to be able to devote their full time to SETI, and perhaps only a few hundred others can manage a part-time commitment to the field. There simply are not enough people to properly investigate all possibilities. The genesis of SETI was in radio astronomy and radio physics, and these elements,

aided by the presence of a few rather strong-willed personalities, have combined to create a kind of snowballing effect. That is, the emphasis on radio techniques is most diligently studied, hence gains more respectability, thus attracts more workers, whose work adds yet more credibility to the effort, and so on.

A second cause of the Cereal Box Syndrome is the frequent confusion of the issues of interstellar ***travel*** and interstellar ***probes***. The first may imply a manned component; the latter generally does not. Too many SETI scientists have been stung by the "UFO" issue. Understandably, they are reluctant to associate themselves with any endeavor which might be misinterpreted by the public as endorsing alien visitations or be scorned by academic colleagues as credulous. But manned and unmanned missions are entirely different things. Interstellar vehicles which must be man-rated, protected against the hostile hard-vacuum high-radiation environment of space, carry expendables able to support human life for decades or centuries and permit a return voyage may be vastly more complex and expensive than fully-automated unmanned spaceprobes on one-way trips.

The third reason for hostility to the notion of interstellar flight as a significant factor in SETI is the physical and economic argument that extrasolar missions are grossly impractical. However, as Robert Forward of Hughes Laboratories has often pointed out, in each case the only thing proven is that various sets of initial assumptions can be chosen to give the appearance of immense difficulty. Recently a group of scientists and engineers working under the auspices of the British Interplanetary Society on "Project Daedalus" produced, after a five-year study, a preliminary design for an automated starship vehicle capable of exploring out to about 10 light-years from the Sun. They concluded that such a mission may become feasible for humanity sometime in the next century.

Calculations showing that the energy required to launch spacecraft to the stars is equal to the total U.S. power generation for a century or will cost 100 gross national products (GNP) are really irrelevant to SETI. This is because these computations chauvinistically presume current human society to be the standard of comparison for the entire universe. Yet almost certainly any race capable of transmitting either radio signals or interstellar probes for SETI purposes must be far in advance of ourselves, possibly on the level of a Kardashev Type II civilization (utilizing a major fraction of the energy output of their sun). It is a simple matter to calculate that to launch a 100,000 ton vehicle on a one-way trip at 1-gee

acceleration to a destination 100 light-years away would require an equivalent relative energy expenditure for a Type II civilization as the launching of a few Saturn V rockets represented to American society a decade ago (about one percent of the GNP annually). Clearly, active interstellar exploration by advanced cultures will require commitment — but hardly an outrageous sacrifice.

The last factor contributing to the pervasiveness of the Cereal Box Syndrome is the lack, until recently, of a well-defined observational program to search for probes such as now exists for radio-SETI. Ronald Bracewell originally proposed that a circular circumsolar orbit somewhere within the stellar "habitable zone" for carbon-water life might be the most logical place to park a visiting extraterrestrial messenger craft, though this represents a rather large search volume. Other suggestions have included the lunar surface by M. W. Saunders, the Earth/Moon Lagrangian points L4 and L5 by Anthony Lawton, the Asteroid Belt by Michael Papagiannis, and Lagrangian "halo orbits" generally by myself. Additional (and surprisingly inexpensive) search proposals are currently being developed, and the first explicit SETI search for Earth-orbiting interstellar probes was recently reported in Icarus (Vol. 42, June 1980). This program was conducted at a total cost of about three hundred dollars.

Twenty years after the historic OZMA project, the serious search for extraterrestrial artifacts in our Solar System has finally begun.

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